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ABSTRACT

This report on the Automated Library Information Control System (ALIS) of the National Technological Library of Denmark focuses on the circulation control functions of the integrated, distributed processing system, which also functions as an online catalog for a bibliographic database of approximately 120,000 records with library location codes. These records represent the current technological-scientific literature. An examination of the online component of the circulation control system discusses functions available to both borrowers and personnel, functions accessible to personnel only, and publication status for borrowers and for lending personnel. The batch processing component is discussed in terms of functions that produce output for internal use and functions that concern system maintenance. Figures illustrate the ALIS system configuration and functions of the system, and sample screen displays show part of an online session, a listing of current issues of a periodical, reservations for a sample publication, borrower loans and borrower reservations, publications charged out to a borrower, publications reserved, borrower's record, the charging out of a publication, and bar code creation. (LMM)

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The ALIS Online Circulation Control System of Danmarks Tekniske Bibliotek

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1983
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REPORT TRITA-LIB-4086 MAY 1983

THE ALIS ONLINE CIRCULATION CONTROL SYSTEM OF DANMARKS TEKNISKE BIBLIOTEK

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IR050517

The ALIS online circulation control system of Danmarks Tekniske Bibliotek

by

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*Key words: Library technology - Circulation control.
Appl - Libraries, Information retrieval, Distributed Processing, ALIS.*

Introduction

Interactive, automatic circulation control has received extensive treatment in the literature about library technology. At the same time numerous model systems have been demonstrated. Presumably only a very small fraction of the systems described and demonstrated are in operation in the various libraries to-day.

The National Technological Library of Denmark (DTB) has through the last couple of years reached a status where all circulation control functions in the integrated library system - ALIS - are operational. Below is a survey with special emphasis on functions in the system that concern this circulation control. Before the description, which is divided into the two main parts of the circulation control system - the online part and the batch part -, a brief survey of the history and general development of the ALIS-system is given.

What is ALIS - automated library information control system.

The National Technological Library of Denmark (DTB) has since 1968 built up a collection of bibliographic data (a database) with localization references for all books, dissertations, serials, reports etc. published in 1968 or later, which have been procured and edp-recorded in DTB. On the database are also registered titles and stock information for all of DTB's periodicals (approx. 12.000). Furthermore, the base contains the catalogue "Dansk List-Tech", which is an annually updated list of current serials within science and technology held by DTB and other Danish research libraries.

Since 1975, all conference reports procured not only by DTB, but by all the other technological central libraries in Scandinavia (Gothenburg, Helsinki, Stockholm and Trondheim) have been registered on the base (approx. 19.000 titles). Finally, as part of DTB's cooperation with the libraries of the Danish technological

schools, the collections of Sønderborg and of Århus Technological Library have been registered (a total of approx. 12.000 titles).

The database thus contains a collection of bibliographic data (by 1983-01-01 approx. 120,000 records, which grow at a rate of 10-15% per year) with library location codes representing current technological-scientific literature. The base is updated once a month. DTB has wished to make these catalogue data available to the general public and especially in a more flexible and user-oriented way than has so far been possible with catalogues printed on paper or produced on COM-film/COM microfiche (COM = Computer Output Microform).

With this objective in mind DTB, has in cooperation with I/S Datacentralen af 1959 (DC) and with financial support from the Danish Council for Scientific and Technical Research and Norddok (now: NordInfo) established an information processing system ALIS (= Automated Library Information System). The catalogue search part of ALIS makes it possible for the user via VDUs (Visual Display Units) or typewriter terminals to search for literature in DTBs database, given names of authors, titles or keywords in titles, subject, UDK-numbers (UDK = the universal classification system), ISBN (International Standard Book Number), ISSN (International Standard Serial Number), CODEN, language codes, year of publication or combinations of these choices. Coincident with the presentation of the bibliographic data, information is given as to which libraries are registered as owners of the retrieved publication (at present for example DTB, Sønderborg Technological Library, Århus Technological Library and for conference reports also the Nordic technological central libraries). The user is thus immediately given information as to where the retrieved publications may be requisitioned for loan or as a copy.

Integrated system

The two main functions in ALIS, catalogue searching and circulation control, are not, however, established as two independent functions, as an important facility in a literature localization system is the user's prospects of learning directly, whether a retrieved publication from the search system is available immediately or not, i.e. the catalogue system must be able to "look into" the circulation system.

A prerequisite for the solution of the two main functions and their coupling has furthermore been that the functions should be based on an online system. One basic element is thus a base with advanced retrieval facilities, based on the edp-cataloguing that DTB has carried out with regard to the library's stock since 1968. The other basic element is the construction of an online circulation system, whose basic information about publications is likewise based on the edp-cataloguing.

Systems Structure

Systemwise, ALIS is divided into subsystems, that are placed on various hardware which communicate among themselves.

The maintenance of the search database is carried out at I/S Datacentralen af 1959. The base is placed in the general freetext search system STAIRS. This system is used generally for search databases, amongst which one can access the set of bases that constitute ALIS. The ALIS bases are updated monthly in connection with DTB's edp-cataloguing.

A TI 990/10 minicomputer is placed at DTB. This mini has two main functions. One is to take care of circulation administration as regards online lendings, returns, reservations etc. and the other is to communicate with the central system on one side (3270) and with the terminals on the other (TTY).

Operation of ALIS

The catalogue search part of ALIS has been operational since the spring of 1979 with access from DTB, by direct call, or through SCANNET and the local university net (DTH-net).

The average use of the base measured in connect hours is at present approx. 25-30 hours a day, 5-7 hours of which comes via SCANNET or by direct call.

The circulation control system was officially opened on November 30th 1981.

Circulation Control System

General introduction.

ALIS also comprises a circulation control system for DTB, which handles both the daily lending routines and the gathering of statistics analyzing the utilization of the library's collections, with a view to an optimization of resource allocation for the various types of literature and subject areas.

The basic data in the circulation control system are information about borrowers on the one hand, and information about items in circulation on the other. The primary purpose of the circulation control is to maintain control of lending, return, and reservation links between a borrower and one or more publications, or between more borrowers and one publication. In ALIS this administration is carried out in a succession of interactive edp-programmes, in which the library staff has direct access to create, alter or

delete basic data, such as borrower- and publication information and relations between these.

Apart from the aperiodic routines carried out in the online part, the circulation administration also contains scheduled functions as for example, the statistical analyses mentioned above or weekly/daily print-outs such as overdue notices, messages about reservations etc.

These functions are solved in the ALIS circulation part as a series of batch-programmes, that, as the name implies, treat groups of transactions and carry out sequential run through of registers.

Circulation Control System. Online part

As mentioned, one part - and the most comprehensive part of the circulation control system - is the online part, the interactive part. The names of the functions are shown in figure 2, which displays the main menu of the system. The functions are discussed below in the following order:

1) Functions accessible both to borrowers and personnel.

2) Functions accessible to personnel only.

We distinguish between two types of functions - enquiry functions and editing functions. Consequently, it is natural to group the functions under the above-mentioned two points as answers to the questions:

- which enquiries can the circulation system handle?
- which problems can the circulation system solve?

In both the enquiry function and the editing function the edp-system must browse in the registers on the basis of key values. These key values must be entered by the user of the system. It is worth noting that a circulation system serves the personnel in a library with freely accesible ("open") shelves in two principally very different situations.

One situation occurs, if the borrower and the item circulated appears at the the circulation control terminal in order to register a lending or a return. In this case, the circulation control system is a data capture tool, whose main function is to finish the transactions as soon as possible to avoid the forming of queues. The data entry to the system is therefore performed with light pens. Bar code labels placed on the circulation object and on the borrower´s card contain unique key values, which are entered into the system. The data capture is carried out with

minimum use of the VDU-terminal's keyboard and the visual control of the transaction on the screen will also be very limited.

The other situation occurs, if a borrower phones the library, in order to reserve a book, for example. We presume that the borrower has no terminal and consequently can not utilize the requisition facility (online ordering) of the library. He has forgotten his borrower number and does not have specific information about the book required. In this case, the circulation control system together with the retrieval system acts as an information system. The person who serves the borrower must find the correct title in the retrieval system. When it has been found, the circulation control system can tell whether the book is already on loan and by searching for the borrower's name, the borrower number can be found. Accordingly, a basis has been reached for deciding whether a reservation can and should be made on the one hand, and the key values which form the basis for updating the reservation register have been established on the other hand. This composite usage of the system's functions and the fact that one function delivers key values to another are important points to remember when going through the brief description of the individual functions below. In figure 3, examples from an online session are given.

Functions accessible both to borrowers and to personnel.

Publication status for borrowers (PL)*

This enquiry function supplies a user with information as to whether a publication found by searching the bibliographic base is on loan, and if reservations exist.
The key value in the circulation system is the registration number of the publication.

The number of borrowed copies of the given publication and the number of registered reservations give the borrower/user the possibility of evaluating whether the publication can be delivered soon or whether many reservations cause a certain waiting period.

* This two-character code is the command used to initiate a specific function. In figure 2, these Danish mnemotechnic codes are explained in the command menu.

Requisition (online ordering) (RK)

If a desired book has been found by searching the bibliographic base, and the publication status (PL) regarding expected time of return is acceptable, the next possible and presumable step is to tell the library via your terminal that the given publication should be set aside to be picked up later, or that you want the publication mailed. This is done by the RK-command that starts a dialogue with the user in order to get the necessary information, (for example the person's name, and whether reservation of the publication is desired etc.), and stores this information together with the bibliographic information on a file in the circulation part. This can be printed out by the circulation personnel and the requests executed.

Functions accessible to personnel only.

Publication status for lending personnel (PU)

Enquiry function, which gives detailed answers about the status of a given publication, i.e. the relation between the publication and more borrowers.
Who has borrowed publication X? Who has reserved the publication? What is the expected date of return? Have overdue notices been sent? Can the loan be renewed?, etc.
The key value for the reference is the publication number and possibly volume number, year, series number, etc. for publications in more volumes or for periodicals.

Name and number references (NA, NR)

Enquiry functions which supply answers to questions about borrower information.
Has a given borrower been registered in the system? What is his address, his telephone number, which category of borrowers does he belong to (institution, nationality etc.), what is his status (is he allowed to borrow) etc.?
The key value is obvious, i.e. the reference must be either name or borrower number.
The name search is carried out with automatic right truncation so that the key A gives a hit on the first borrower in the register, for example ABEL, K.

Borrower loans and borrower reservations (US, LR)

Enquiry functions which give answers to the relation between one given borrower and possibly more publications.
Which books are lent to borrower Y? Which books are reserved? When has a given book been borrowed? When must it be returned? Has the borrower had an overdue notice? How does he want a reserved book delivered (mailed, picked up at the library)? What is the latest date at which a reserved book may be delivered? etc.
The key value is the borrower number.

Borrower creation, borrower updating, and borrower deletion (LO, LA, LS)

Updating functions that give the staff the possibility of maintaining the borrower register.
A new borrower may be registered in the system, a borrower card with optically readable bar code handed out, and the bar code and a borrower number are now alternative key values for borrower information. When entering the borrower, the system checks to see if he is already registered.
Information about the borrower (name, address, etc.) may be altered, and finally, the borrower may be deleted altogether. A borrower is not deleted until all borrowed publications have been returned.

Publication creation, publication updating, publication deletion, bar code creation, bar code updating, and bar code deletion (PO, PA, PS, SO, SA, SS)

Updating functions that give the staff the possibility of maintaining basic data about circulation objects. Every circulation object catalogued since 1968 and all periodicals are registered in the circulation part with registration number, brief title, classification system number, bar code, and copy number plus, for works in more volumes and periodicals with specific information, volume, publication year, issue, and possibly page information. Registration number, title, and classification system number are delivered automatically from the background system while the other information is entered manually in connection with the actual marking of the circulation objects with bar code labels.

Apart from the registration of catalogue data in machine-readable form, one of the biggest tasks in connection with the implementation of ALIS has been the marking of all items to be circulated - books and periodicals - with a bar code and the automatic registration of the connection between the individual circulation object and the bibliographic description. This registration work is

assessed as an absolute condition for an effective and user-friendly tool in circulation control.

An item to be circulated, brought to the check-out counter without bar code label, must be entered in the system before it can be borrowed. It might be a publication earlier than 1968, or possibly a loan to DTB from another library. This is the reason that functions are found that make it possible to maintain basic data for the publications - specifically the short title etc.
If a bar code label is damaged, a new one is put on and the bar code information updated.

The bar code labels used are produced by means of a bar code printer in the library. The code applied is the MSI code, PWM 2:1 ratio with modulus 11 + modulus 10 check digits. This coding is in agreement with the practice in the Danish public library sector, and the number sequence chosen is likewise based on the numbering system plan for Danish libraries.

Circulation, circulation renewal, and returns (UD, UF, AF)

Updating functions, that make it possible for the circulation staff to maintain the connection between one borrower and one or more items in circulation.

By reading the bar code from the borrower card and the bar code from the item to be circulated the loan is registered.

If the borrower wants his loan renewed, the circulation registration is found in the circulation file: for example, by means of the publication's registration number, and the date of return is altered.

On return of the publication, the publication's bar code is read and the connection between the borrower and the circulation object deleted. If the returned publication is reserved, a new circulation is entered and the returned publication is put aside for later pick-up, while an automatic message is printed for the new borrower, informing him that the publication has been returned. Alternatively, the returned publication is sent to the new borrower.

Reservation, reservation alteration, and reservation deletion (RE, RA, RS)

Updating functions, that make it possible for the circulation staff to maintain the connection between several borrowers and one

publication, which, of course, may be stocked by the library in several copies.

The borrower's number and the publication's number, plus, for works in more volumes and periodicals, volume number, publication year, and issue information are linked in the reservation file. The earliest reservation will be the first to be converted into an issue by return, unless the personnel has taken measures at the registration which change this priority.
The system prints - by command made at the registration of a reservation - a message to the borrower, informing him that the reservation has been made.

Circulation control system. Batch-part

As already mentioned, this part of the circulation control system covers a number of functions that consist of periodic processing of groups of transactions and sequential run-through of registers. Naturally, these kinds of functions are available only to specially trained staff at DTB.

An easy to grasp categorization of the batch functions is to divide them into:

1) Functions that produce output for borrowers.
2) Functions that produce output for internal use.
3) Functions that concern system maintenance.

Output for borrowers

At previously determined intervals, or initiated by order of the circulation personnel, one or more of the following batch functions may be carried out:

- Print-out of overdue notices. The system prints overdue notices to borrowers when a return is overdue. A publication is recalled up to four times. After the fourth overdue notice, the recall procedure is tranferred to manual treatment and the borrower "blacklisted". This means that the terminal will print a message to this effect to the circulation staff if a remiss borrower tries to borrow a new book.

- Print-out of messages stating that a reservation has been made. This type of message is sent to borrowers who have requested a book by telephone or via online ordering.

- Print-out of message stating that a reserved publication has been returned.

Dependent on the information stored in the file with borrower data, the messages are printed in Danish or English.

Output for internal use

The functions are initiated under the same conditions as mentioned above. This means that the output can be produced automatically either at set intervals or occasionally.

- Print-out of requisitions.

- Print-out of borrower lists after more closely defined extraction criteria.

- Print-out of lists from other files, for example the circulation- or reservation registers. It is thus possible to extract a list of publications with two or more reservations.

- Print-out of transaction counts. Here the staff can get overviews, for example, a day's total number of lendings, number of returns, number of new borrowers, etc.

- Transfer of logfile to tape. These data can then be made subject to actual statistical elaboration.

System maintenance with batch routines

To this category of functions belong a number of technically oriented tasks which often are carried out with actual technical assistance.
For example, a need may arise for entering back-up or updating registers from tape. Also fixed routines exist for security copying of discs, emptying of transaction log, etc.

File structure and software

It is outside the scope of this article to elaborate in detail on the technical background for the above described user functions. Briefly, however, it might be mentioned that, by extensive use of standard facilities in TI operative systems, a customer designed database management system has been constructed. There is multi-access to functions, which are represented in the system by one programme per function. The programmes have been written in FORTRAN, and the modular code is equipped with extensive comments. The programmes are operating on a multi-key indexfile system and the logical registers, which are mentioned in the description above, are, as a main rule, complemented by a physical file.

The most important files are named, as follows

1 Bar code register
2 Title register
3 Borrower register
4 Loan register
5 Reservation register

On each file there are records with datafields and so-called secondary keys accessible for online updating.
The primary key in each record is a unique key which cannot be updated in one step. If changes to primary key occur, you therefore have to delete the record and create a new one. Access points to records are either primary or secondary keys.

Below is summarized the contents of each file.

Bar code register: Bar code number (primary), registration number (secondary), issue information (secondary), status information (whether on shelf or not) (data).

Title register: Registration number (primary), publication type (data), title (data), location (data), creation date (data), owner of publication (other libraries) (data).

Borrower register: Borrower number (primary), borrower's bar code (secondary), category (data), status (data), creation date (data), date of status changes (data), name (secondary), c/o name (data), address (data), phone number (data).

Loan register: Borrower number (primary), temporary information about borrower (data), registration number (secondary), issue information (secondary), bar code number (secondary), method of delivery (data), date of borrowing (data), date of delivery (data), claiming status (data).

Reservation register: Borrower number (primary), temporary information about borrower (data), registration number (secondary), issue information (secondary), status for postal messages (data), method of delivery (data), date of reservation (data), last date of interest (data).

Finally, it should be mentioned that automatic reorganization and log facilities are available, and furthermore security copies of system and files are stored both on disc and tape.

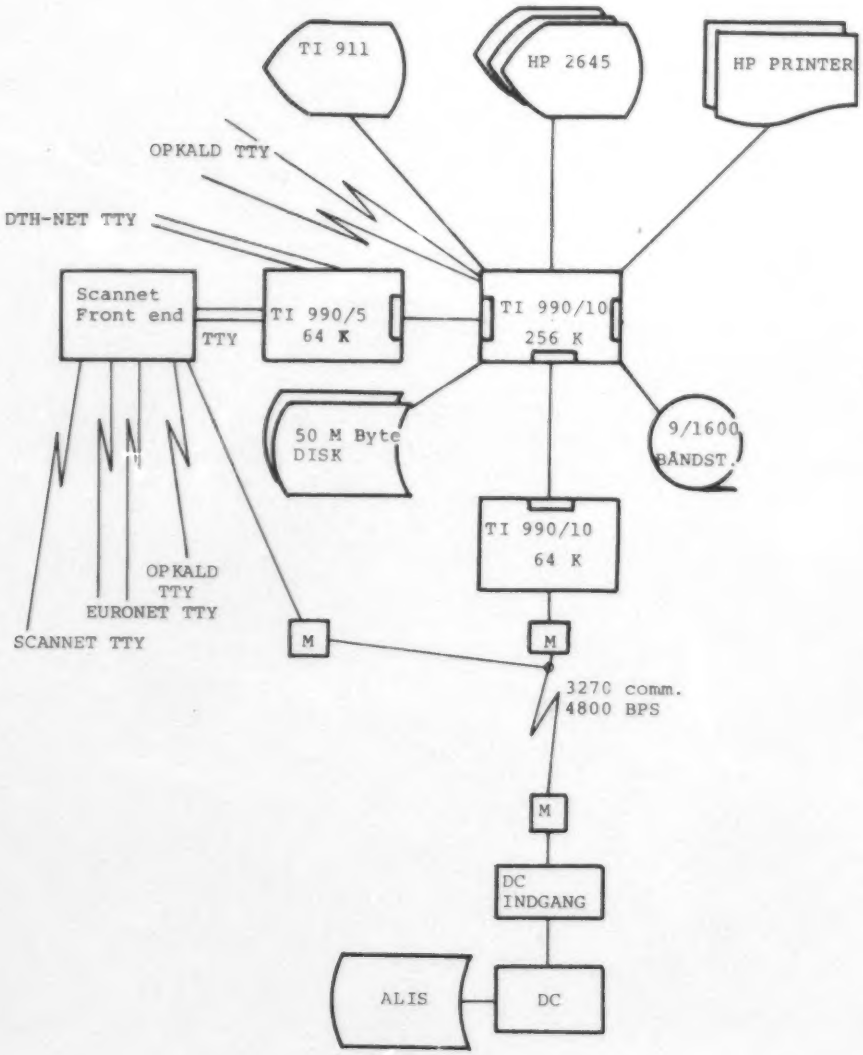
Conclusion

The development of the combined catalogue search and circulation control system as a distributed processing system has proved to be useful. Implementation of the two main functions (catalogue search and circulation control in a big mainframe computer situated about 15 miles away and a local minicomputer installation respectively) saves telecommunication costs, and in case of a malfunction in one part of the system, reduces the impact of this malfunction on the other part of the system.

The automation of the circulation system offers the following advantages, for example:

- online ordering of loan or photocopy, immediately in continuation of a catalogue search
- the system provides an up-to-date and accurate record of items on loan or issuable
- the system provides a record of which books a particular borrower has on loan
- the system improves the speed of issue and discharge processes for the greater convenience of users
- the system reduces staff time in issuing and discharging items
- the system secures a more effective use of the library stock by giving greater control over reservations and by monitoring use
- the system can effectively spot defaulting borrowers
- the system reduces staff time in checking and file maintenance by producing, automatically, reminders, messages about reserved items ready to be picked up, other reports etc.

Figure 1: ALIS system configuration



BÅNDST. = Magnetic tape unit
DC = I/S Datacentralen af 1959 (Host computer in SCANNET and EURONET)
DTH-NET = Terminal network of the Technological University of Denmark
HP = Hewlett-Packard
INDGANG = Line control unit
M = Modem
OPKALD = Direct call

Figure 2: Functions of ALIS circulation system

UD	ISSUE	LO	BORROWER REGISTRATION
UF	RENEWAL	LA	BORROWER UPDATING
AF	DISCHARGE	LS	BORROWER DELETION
US	BORROWER LOANS AND RESERVATIONS	NA	NAME SEARCH
		NU	NUMBER SEARCH
RE	RESERVATION	PO	PUBLICATION REGISTRATION
RA	RESERVATION UPDATING	PA	PUBLICATION UPDATING
RS	RESERVATION CANCELLATION	PS	PUBLICATION CANCELLATION
LR	BORROWER RESERVATION	PL	PUBLICATION STATUS FOR BORROWERS
		PU	PUBLICATION STATUS FOR CIRCULATION PERSONNEL
SO	BAR CODE REGISTRATION	FO	PRE-PHASE SEARCH
SA	BAR CODE UPDATING	ST	STAIRS SEARCH
SS	BAR CODE CANCELLATION	SL	FINISH

CHOOSE FUNCTION _ _

Figure 3: Examples from an on-line session

Fig.3a: Publication status for circulation personnel. The publication number is keyed in and short title plus summary of holdings, number of copies on loan and number of reservations are displayed

```
PU - PUBLIKATIONSSTATUS FOR UDLÅNSPERSONALE - Udskrift fra UDLÅNSREGISTER

  Publnr:     001155261. Publtype   m
    Titel     Saunte,F., Vand. 2.udg.København,Akademisk forlag,
              1973. (Forsk.pag.). (Med bibl.)
  Bestand     C3,D1,S1:C(P)
 Udlånt C     3       Långiver
 Udlånt K     0     Opret.dato   261278
  Res.ant     4   Indlånskode


   Volume                      Ex   01          Udlånsdato  210283     Levering
      Del                                    Afleveringsdato  230383   Rykkerkode
    Hæfte                  Publid   300001200902
       År                 Lånerref


  Lånernr     240351 Anni  Navn Stilling  NICLASEN ANFINN
  Lånerid     400180428         C/O Navn
 Kategori     01                    Vej   BØJSAGERVEJ 8
   Status     1                  Postnr   2500        By VALBY

Bladring
```

Fig.3b: Display in continuation of fig.3a showing the current issue(s) listing for publication no. 001155261

```
PU - PUBLIKATIONSSTATUS FOR UDLÅNSPERSONALE - Udskrift fra RESERVATIONSREGISTER

  Publnr:     001155261. Publtype    m
    Titel     Saunte,F., Vand. 2.udg.København,Akademisk forlag,
              1973. (Forsk.pag.). (Med bibl.)
  Bestand     C3,D1,S1:C(P)
Udlånt C       3       Långiver
Udlånt K       0     Opret.dato   261278
  Res.ant      4    Indlånskode


   Volume                                  Reservationsdato  210283   Levering S
      Del                  Besked   C          Udløbsdato    151183
    Hæfte
       År                Lånerref


  Lånernr     290260 FRFU  Navn Stilling  FUP, FREDERIK
  Lånerid     400177556           C/O Navn
Kategori      07                     Vej   SMUGLERGYDEN 5
   Status     1                   Postnr   DK-9990      By Skagen

Bladring
```

Fig.3c: Display in continuation of fig.3c showing the actual reservations of publication no. 001155261

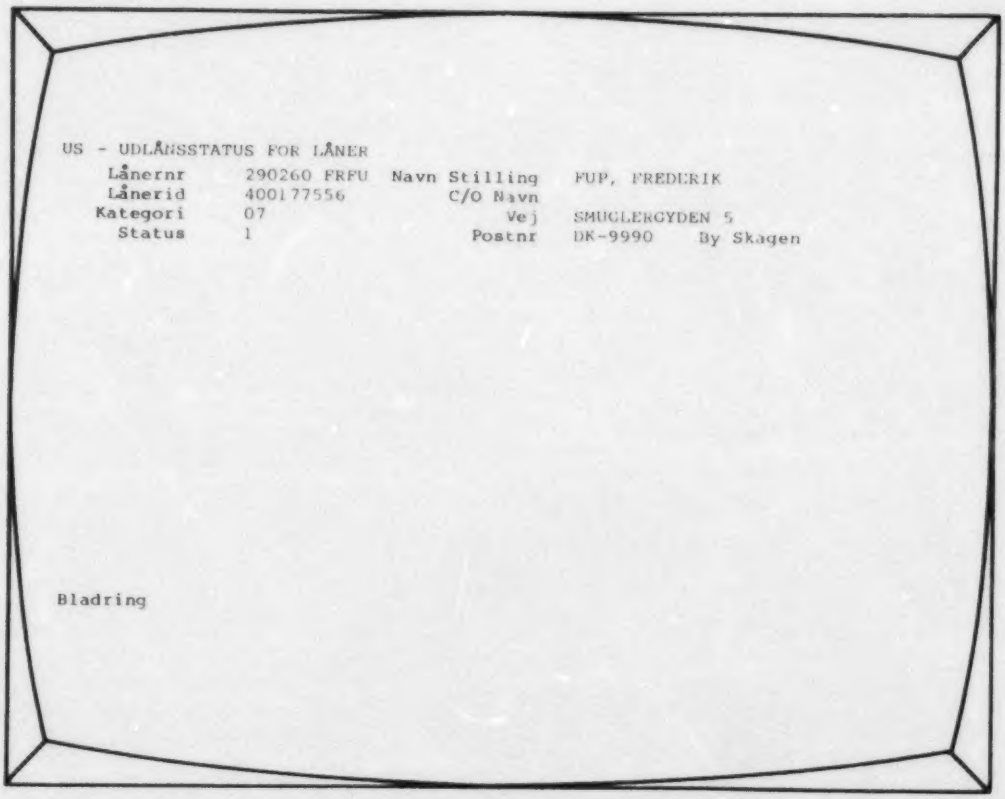
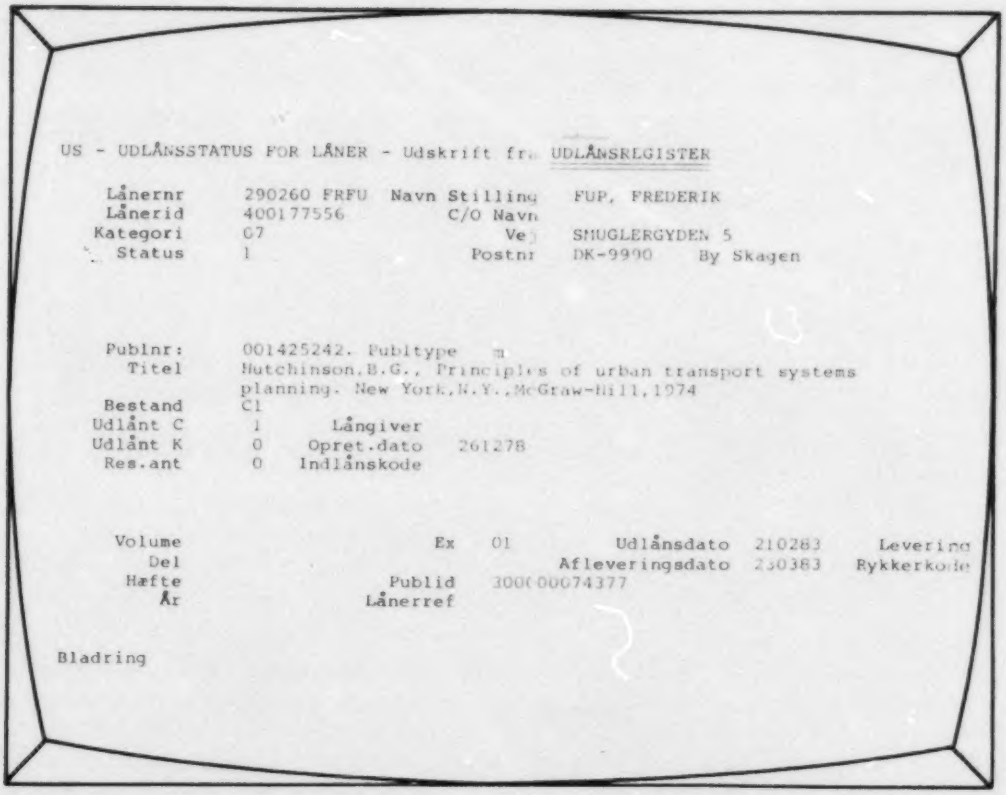

US - UDLÅNSSTATUS FOR LÅNER
Lånernr 290260 FRFU Navn Stilling FUP, FREDERIK
Lånerid 400177556 C/O Navn
Kategori 07 Vej SMUGLERGYDEN 5
Status 1 Postnr DK-9990 By Skagen
Bladring

Fig.3d: Borrower loans and borrower reservations. The borrower record is shown after keying in the borrower number



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US - UDLÅNSSTATUS FOR LÅNER - Udskrift fra UDLÅNSREGISTER

    Lånernr      290260 FRFU  Navn Stilling   FUP, FREDERIK
    Lånerid      400177556          C/O Navn
   Kategori      07                    Vej    SMUGLERGYDEN 5
     Status      1                  Postnr    DK-9990     By Skagen


    Publnr:      001425242. Publtype   m
      Titel      Hutchinson,B.G., Principles of urban transport systems
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   Bestand       C1
  Udlånt C       1       Långiver
  Udlånt K       0     Opret.dato    261278
   Res.ant       0    Indlånskode


    Volume                        Ex   01          Udlånsdato  210283     Levering
       Del                                       Afleveringsdato  250383   Rykkerkode
     Hæfte                    Publid   300000074377
        År                  Lånerref

Bladring
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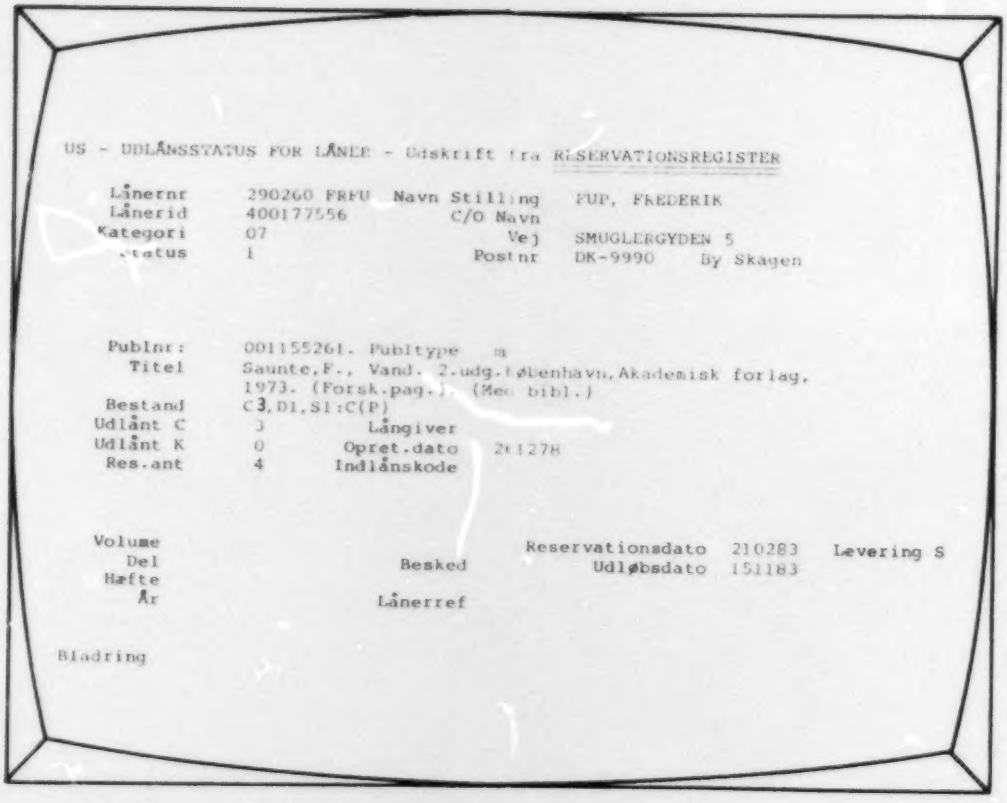
Fig.3e: Continuation of fig.3d showing publication(s) lent out to borrower no. 290260FRFU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Lånernr 290260 FRFU Navn Stilling FUP, FREDERIK
Lånerid 400177556 C/O Navn
Kategori 07 Vej SMUGLERGYDEN 5
Status 1 Postnr DK-9990 By Skagen
Publnr: 001155261. Publtype m
Titel Saunte,F., Vand. 2.udg.København,Akademisk forlag,
1973. (Forsk.pag.). (Mec bibl.)
Bestand C3,D1,S1:C(P)
Udlånt C 3 Långiver
Udlånt K 0 Opret.dato 201278
Res.ant 4 Indlånskode
Volume
Del Besked Reservationsdato 210283 Levering S
Hæfte Udløbsdato 151183
År Lånerref
Bladring

Fig.3f: Continuation of fig.3e showing publication(s) reserved to borrower no. 290260FRFU

Fig.3g: Borrowers record is displayed by keying in borrower's name

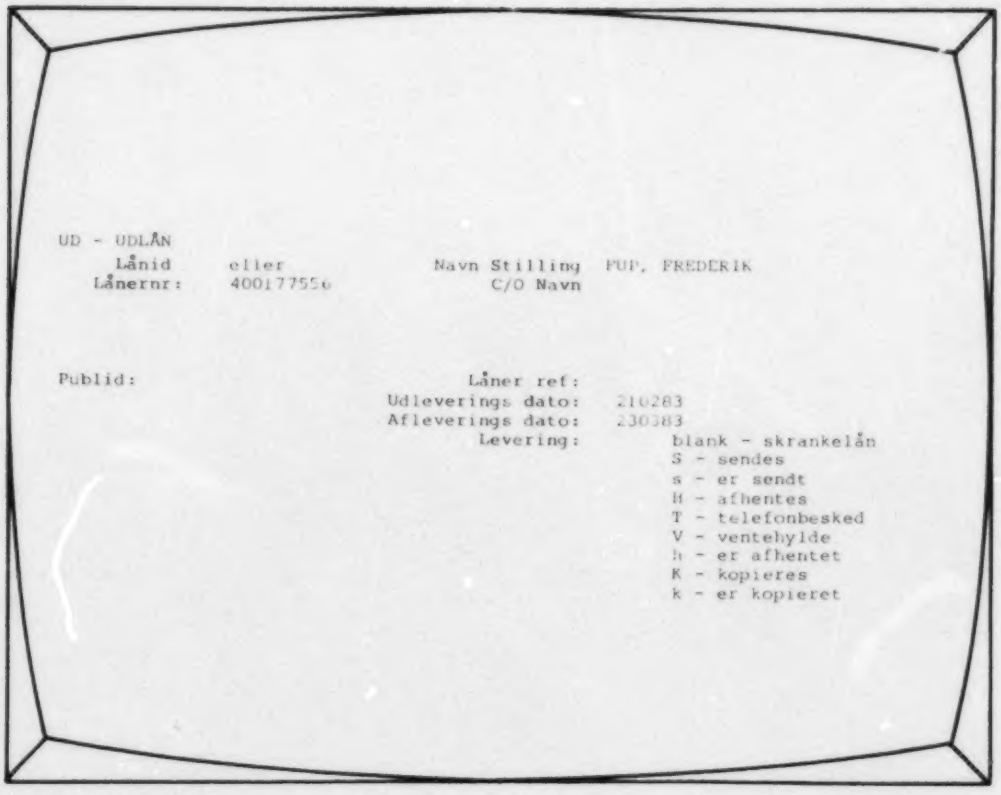

Fig.3h: Issuing of a publication requires input by light pen of borrower no. (bar code) and publication no. (bar code)

Fig.3i: Bar code creation. The bar code is read by light pen and the publication number is keyed in. The system displays a short title record

1102 M. Tell: *A Note about China's Scientific and Technological Information System* (July 1980) 50 p.
1104 S. Schwarz: *A National Documentation and Information Centre of the Kenya National Council for Science and Technology* (Publ. as Unesco Report PGI/80/176 [Paris 1980]) 50 p.
1105 S. Schwarz: *Pest Management Documentation Service at the International Centre of Insect Physiology and Ecology (ICIPE)* (Publ. as Unesco Report PGI/80/161 [Paris 1980]) 31 p.
1107 M. Brawne and S. Schwarz: *Development of the Institute of Scientific and Technical Information of China (ISTIC)* (Publ. as Unesco Report PGI/81/104 [Paris 1981]) 83 p.
1113 S. Schwarz: *Slutrapport till DFI för projektet "Användning av minidator i forskningsbibliotek"* (jan. 1983) 18 p.
Analysis (Dec. 1980) 163 p.
2018 *LIST TECH 80/83. List of foreign periodicals and serials in Swedish libraries within the fields of mathematics, physics, chemistry, technology, architecture, photography, geodesy and industrial economics* (1983) 214 p.
2019 R. Hjerppe: *Supplement to a "Bibliography of Bibliometrics and Citation Analysis"* (TRITA-LIB-2013) [Publ in *Scientometrics 4* (1982) 241–281]
4066 R. Gaillardin, F. Gourd and D. Sanz: *Pascal Data Base. File Description and Indexing Rules in Chemistry, Biology and Medicine* (Jan. 1980) 22 p.
4068 Paralog AB: *An Introduction to 3RIP – An Interactive Text Base System* (March 1981) 33 p.
4069 M. Löfström, J. Hultgren and M. G. Lindquist: *Framework for a Future Swedish Policy for Research and Development in Information Science and Technology* (March 1981) 60 p.
4071 R. Larsson and J. Sunnebäck: *3RIP version 4.0 (including the Euronet Common Command Language)* (Oct 1981) 48 p.
4075 S. Abrahamsson, R.E. Carter och B. Sundman: *Utveckling och användning av icke-bibliografiska databaser* (Mars 1982) 34 p.
4076 Lian Ya-chun: *RAMAS: The RITL Automated Management System* (Nov. 1982) 90 p.
4077 M. Löfström: *A Description of the Text Data Base System TDBS* (Nov. 1982) 28 p.
4078 G. Werme: *RAMAS – KTHBs integrerade biblioteksystem för minidator. Önskat innehåll och slutprodukter i ett planerat förvärvssystem* (dec. 1982) 70 p.
4086 B. Barnholdt and N Højer-Pedersen: *The ALIS Online Circulation Control System of Danmarks Tekniske Bibliotek* (May 1983) 23 p.
5008 L. Klasén och P. Sabsay: *Informationssökning för tekniker och naturvetare* (aug. 1978, 6.e uppl. aug. 1982) 71 p.
5009 L. Höglund et al.: *En studie av informationssökning och biblioteksanvändning i högre utbildning* (april 1979) 64 p.
6013 S. Schwarz and U. Willers (eds): *Knowledge and Development–Reshaping Library and Information Services for the World of Tomorrow (A Festschrift for Björn Tell)* (Sept. 1978) 307 p.
6014 R. Hjerppe: *An Outline of Bibliometrics and Citation Analysis* (Oct. 1978) 82 p.
6017 O. Persson: *Critical Comments on the Gatekeeper Concept in Science and Technology* (Jan. 1980) 14 p.
6018 S. Schwarz: *Problems of I&D Services in LDCs – The Small Systems Syndrome* (March 1982) [Publ. in *Tidskrift för Dokumentation 37* (1981) 5/6]
6019 A. Bookstein: *Recent Development in the Theory of Information Retrieval* (Dec. 1982) 28 p.
6020 S. Schwarz: *Scientific and Technical Information in Development – the Small Systems Syndrome and the Inverted Binocular Strategy* (Jan. 1983) [Publ. in *Journal of Documentation 39* (1983) 38–47].

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